IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	Docket No.: **TI-35773**
Robert B. Staszewski	Examiner: **Flores, Leon**
Serial No.: **10/758,863**	Art Unit: **2611**
Filed: **01/16/2004**	Conf. No.: **6568**

For: **RADIO FREQUENCY BUILT-IN SELF TEST FOR QUALITY MONITORING OF LOCAL OSCILLATOR AND TRANSMITTER**

APPELLANTS' BRIEF – 37 C.F.R. § 41.37

Commissioner for Patents
Alexandria, VA 22313-1450

Dear Sir:

This Appeal Brief is submitted in connection with the above-identified application in response to the Office Action of September 11, 2009. Please apply the previously paid notice of appeal fee and appeal brief fees to any fees due.

I. REAL PARTY IN INTEREST

Texas Instruments Incorporated is the real party in interest.

II. RELATED APPEALS AND INTERFERENCES

Appellants are not aware of pending appeals in related applications.

III. STATUS OF CLAIMS

Claim 4 is canceled. Claims 1-3 and 5-54 are pending in the application. Claims 12, 18, 26 and 45-47 are objected to as being dependent upon a rejected base claim, but allowable if amended to include all of the limitations of the base claim and any intervening claims. Rejection of Claims 1-3, 5-11, 13-17, 19-25, 27-44 and 48-54 was made by the Examiner in the Office Action dated September 11, 2009. Claims 1-3, 5-11, 13-17, 19-25, 27-44 and 48-54 are on appeal. Claims 1-3, 5-11, 13-17, 19-25, 27-44 and 48-54 are reproduced in the Appendix to Appellants' Brief filed herewith.

IV. STATUS OF AMENDMENTS

All amendments have been entered.

V. SUMMARY OF THE CLAIMED SUBJECT MATTER

In one embodiment of the invention, independent Claim 1 requires and positively recites, a method for testing (Title, Abstract, Fig 8 & 9a-d) a radio frequency (RF) circuit (Title, Abstract, Fig 2 & 3 & 6) comprising:

observing a signal (PHE or phi_E[k] signal in Figs 2 ([0031] lines 1-2) , 3 ([0034] lines3-6), 6; PHE or "filtered PHE" in Fig 10 ([0059], lines 3-6); step "observe internal digital signal" 805 in Fig 8 ([0048] lines 1-4); steps 902, 922, 942, 962 in Figs 9a-d) from the RF circuit (in Fig 10: PHE signal fed into signal analyzer 1005), wherein the signal is a digital signal from within a processing portion of the RF circuit, wherein the signal has a high degree of correlation with an RF output of the RF circuit, and wherein the observing occurs outside of the RF circuit;

manipulating the signal outside of the RF circuit (in Fig 10: PHE internal signal fed into signal analyzer 1005, which is external to the RF circuit); and

producing a metric (output of signal analyzer 1005 in Fig 10) for the test outside of the RF circuit based on results from the manipulating.

In another embodiment of the invention, independent Claim 32 requires and positively recites, a circuit comprising:

a processor ([0059] lines1-3; signal analyzer 1005 in Fig 10) coupled to a radio frequency (RF) circuit ([0058] lines 1-11ADPLL 200, 300, 600 of Figs 2, 3, 6, respectively), the processor containing circuitry to manipulate digital signals (PHE or "filtered PHE" in Fig 10, "other signals" in [0061]) from the RF circuit to provide a performance metric (output of signal analyzer 1005) for the RF circuit; and

a control signal input ([0059], lines 9-10; "control", "window" inputs to signal analyzer 1005) coupled to the processor, wherein the control signal input can enable an observation and manipulation of the digital signals.

In yet another embodiment of the invention, independent Claim 41 requires and positively recites, a circuit comprising:

a reference phase accumulator ([0031] lines 3-6; 205 in Figs 2 & 3) coupled to a signal input (FREF), the reference phase accumulator containing circuitry to compute a reference phase ([0031] line 6; R_R[k] output of 205);

a phase detector ([0031] lines 2-3; 210) coupled to the reference phase accumulator, the phase detector containing circuitry to compute a difference ([0031] lines 1-2; phi_E[k] output of 210) between the reference phase and a variable phase;

a digitally-controlled oscillator ([0033] line 7; 225) coupled to the phase detector, wherein the performance of the DCO can be ascertained by a test circuit (signal analyzer 1005) outside of the circuit observing an output of the phase detector, wherein the test circuit manipulates the observed output and generates a performance metric for the DCO based, at least in part, on the manipulation; and

a variable phase accumulator ([0032] lines 1-4; 235; Figs 2 & 3) coupled to the DCO and the phase detector, the variable phase accumulator containing circuitry to compute the variable phase.

In still yet another embodiment of the invention, independent Claim 48 requires and positively recites, a method for operating a cellular phone ([0044] lines 6-7, "if the device under test is a cellular telephone"), comprising:

performing ([0044] lines 5-8, "carrier can run tests on the device") built-in self-test (BIST) on a parameter associated with the cellular phone; and

reporting ([0044] lines 8-9, "and then the device can provide the results to the carrier") to a cellular service provider through a wireless medium when the BIST reports the parameter to be degraded beyond a limit.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

1) Are Claims 1, 3, 5-11, 13-17, 19-23, 25 and 27-31 patentable under 35 U.S.C. 103(a) over Sunter et al. (hereinafter Sunter)?

2) Is Claim 24 patentable under 35 U.S.C. 103(a) over Sunter et al. (hereinafter Sunter), as applied to claim 1 above, and further in view of Wong et al. (hereinafter Wong)(US Patent 5,295,079)?

3) Are Claims 32-40 patentable under 35 U.S.C. 103(a) over Wong et al. (US 5,295,079)?

4) Are Claims 41-44 patentable under 35 U.S.C. 103(a) over Staszewski et al. (hereinafter Staszewski)(US Publication 2002/0191727 A1), and further in view of Sunter et al. (hereinafter Sunter)(US Patent 6,396,889)?

5) Are Claims 48-50 and 52-54 patentable under 35 U.S.C. 103(a) as being unpatentable over Kim et al (hereinafter Kim)(US Patent 6,885,700 B1) in view of Ortiz Perez et al (hereinafter Perez)(US Patent 5,966,428)?

6) Is Claim 51 patentable under 35 U.S.C. 103(a) over Kim et al (hereinafter Kim)(US Patent 6,885,700 B1) and Ortiz Perez et al (hereinafter Perez)(US Patent 5,966,428), as applied to claim 48 above, and further in view of Reddy et al. (hereinafter Reddy)(US Patent 6,636,979 B1)?

7) Is Claim 1 patentable under 35 U.S.C. 103(a) as being unpatentable over Wong et at. (hereinafter Wong)(US Patent 5,295,079)?

VII. ARGUMENTS

1) Claims 1, 3, 5-11, 13-17, 19-23, 25 and 27-31 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Sunter et al. (hereinafter Sunter). Appellants respectfully traverse this rejection as set forth below.

An obviousness inquiry is decided as a matter of law, based on four general factual inquiries as explained in *Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966), and reaffirmed in *KSR International, Inc. v. Teleflex, Inc.*, 550 U.S. 398, 406-07 (2007). The patent examiner is responsible for marshalling the references whose teachings are most relevant to the claimed invention, and evaluating the claimed invention against these teachings, from the viewpoint of a person of ordinary skill in the field of invention. See *Graham*, supra; *In re Kubin*, 561 F.3d 1351, 1355 (Fed. Cir. 2009); see generally *In re Oetiker*, 977 F.2d 1443, 1445-47 (Fed. Cir. 1992).

In proceedings before the Patent and Trademark Office, "the Examiner bears the burden of establishing a prima facie case of obviousness based upon the prior art". In re Fritch, 23

USPQ2d 1780, 1783 (Fed. Cir. 1992) (citing In re Piasecki, 745 F.2d 1468, 1471-72, 223 USPQ 785, 787-88 (Fed. Cir. 1984). "The Examiner can satisfy this burden **only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references**", In re Fritch, 23 USPQ2d 1780, 1783 (Fed. Cir. 1992)(citing In re Fine, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988)(citing In re Lalu, 747 F.2d 703, 705, 223 USPQ 1257, 1258 (Fed. Cir. 1988)).

Similarly, although couched in terms of combining teachings found in the prior art, the same inquiry must be carried out in the context of a purported obvious "modification" of the prior art. **The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification.** In re Gordon, 733 F.2d at 902, 221 USPQ at 1127. Moreover, **it is impermissible to use the claimed invention as an instruction manual or "template" to piece together the teachings of the prior art so that the claimed invention is rendered obvious.** In re Gorman, 933 F.2d 982, 987, 18 USPQ2d 1885, 1888 (Fed.Cir.1991). See also Interconnect Planning Corp. v. Feil, 774 F.2d 1132, 1138, 227 USPQ 543, 547 (Fed.Cir.1985).

Appellants respectfully point out that, "all words in a claim must be considered in judging the patentability of that claim the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970).

Claim 1 requires and positively recites, a **method for** ***testing a radio frequency (RF)*** **circuit** comprising: "observing a signal **from the *RF circuit***, wherein the signal is a digital signal **from within a processing portion of the *RF circuit*, wherein the signal has a high degree of correlation with an RF output of the *RF circuit***, and wherein the observing occurs outside of the RF circuit", "manipulating the signal outside of the RF circuit" and "producing a metric for the *test* outside of the RF circuit based on results from the manipulating".

Claim 25 requires and positively recites, a **method for testing a radio frequency (RF) circuit containing an all-digital phase-locked loop** comprising:

setting **the all-digital phase-locked loop** to a certain bandwidth;

observing a signal **from the *RF circuit***, wherein the signal is a digital signal **from within a processing portion of the *RF circuit*, wherein the signal has a high degree of correlation with an RF output of the *RF circuit***, and wherein the observing occurs outside of the RF circuit;

manipulating the signal outside of the RF circuit; and

producing a metric for the test outside of the RF circuit based on results from the manipulating, wherein the test is for estimating phase noise power **and the signal is an output of a phase detector**, and wherein the manipulating comprises calculating a mean square error of the signal.

In contrast, Sunter discloses a method of testing phase locked loops (PLL) and a testing circuit comprising the steps of applying a normal stimulus signal whose frequency is within the lock range of the PLL to the input of the PLL, substituting the normal input stimulus with an alternative signal derived from an internal feedback of the PLL, adding or deleting one or more cycles from the alternative signal and observing the response of the PLL to the alternative signal (Abstract, lines 1-8). But nowhere does Sunter teach or suggest that his method of testing phase lock loops is, or can be used, for testing a radio frequency (RF) circuit.

The following dictionary definitions for the term "radio frequency" confirm the understanding one having ordinary skill in the art would understand the term to mean:

> **Radio frequency (RF).** Those *frequencies* of the *electromagnetic spectrum* that are normally associated with *radio-wave propagation*. The nomenclature of radio frequencies is as follows:

Frequency Subdivision	Frequency Range	Metric Subdivision
VLF	3-30 KHz	myriametric waves
LF	30-300 KHz	kilometric waves
MF	300-3000 KHz	hectometric waves

HF	3-30 MHz	decametric waves
VHF	30-300 MHz	metric waves
UHF	300-3000 MHz	decimetric waves
SHF	3-30 GHz	centimetric waves
EHF	30-300 GHz	millimetric waves
THF	300-3000 GHz	decimillimetric waves

(Communications Standard Dictionary, Second Edition. 1989)(Attachment-1).

> Radio frequency (1) (A) (data transmission) (Loosely) The frequency in the portion of the electromagnetic spectrum is between the audio-frequency portion and the infrared portion. (B) (data transmission) A frequency useful for radio transmission. Note: The present practicable limits of radio frequency are roughly 10 KHz (kilohertz) to 100,000 MHz (megahertz). Within this frequency range electromagnetic radiation may be detected and amplified as an electric current at the wave frequency. (The IEEE Standard Dictionary of Electrical and Electronics Terms, Sixth Edition (1996)(Attachment-2).

Thus, one having ordinary skill in the art would under stand the term "radio frequency (RF)" to be: those frequencies of the electromagnetic spectrum that are normally associated with radio-wave propagation (i.e., the electromagnetic spectrum between the audio-frequency portion and the infrared portion).

Contrary to Examiner's determination, there is no teaching whatsoever in Sunter that his method and circuit for built in self test of phase locked loops is, or can be applicable, to radio frequency circuits. The terms "radio frequency" and "rf" are not set forth anywhere in Sunter's specification. Moreover, no frequency ranges are identified that could be implied to be associated with a "radio frequency" range. As such, Sunter fails to teach or suggest, "a **method for *testing a radio frequency (RF)* circuit**", as required by Claims 1 & 25.

Further, being that Sunter fails to teach or suggest, "a **method for *testing a radio frequency (RF)* circuit**", as required by Claims 1 & 25, by definition it further fails to teach or suggest, "observing a signal **from the *RF circuit***, wherein the signal is a digital signal **from**

within a processing portion of the *RF circuit*, wherein the signal has a high degree of correlation with an RF output of the RF circuit, as further required by Claims 1 & 25.

Examiner argues that the claim limitation: "a method for *testing a radio frequency (RF)* circuit", "observing a signal from the *RF circuit*", is taught in Figs. 5, 9 & 11 and specifically cites "the error signal is observed using test circuits" See col. 2, lines 50-54, col. 3, lines 4-6 & fig. 9 & col. 8, lines 9-16)(OA, page 9, line 25 – page 10, line 2; OA, page 15, lines 5-8). However, there is NO "error signal" identified anywhere in Examiner's identified evidence. In actually, the identified text talks about "Exor" not "error". Exor is a logic type gate and has nothing to do whatsoever with phase error or any error signal. Moreover, the "Exor" signal exists only between exclusive-or (Exor) logic gate 29 and low pass filter 28 within PLL 10. Regardless, "Exor" signal never exits PLL 10. As such, Sunter fails to teach or suggest, ", "observing a signal **from the *RF circuit***", as required by Claims 1 & 25. Accordingly, Examiner's determination is supposition not supported by fact - little more than improper hindsight reconstruction. For this reason alone, the 35 U.S.C. 103(a) rejection of Claims 1 & 25 is improper and must be reversed.

Examiner next argues that Sunter teaches the claim limitation "wherein the signal is a digital signal from within a processing portion of the RF circuit (see Fig. 5 "Exor Output is a digital signal")(OA, page 10, lines 2-3; OA, page 15, lines 8-9). However, reference to Fig. 5 shows that the Exor Output signal is generated at the output of exclusive-or (Exor) logic gate 29. Signal "Exor Output" in generated internal to PLL 10. There is no teaching or suggestion in Sunter that PLL 10, which is internal to test circuit 80, is, or can be, a part of an RF circuit. As such, Sunter fails to teach or suggest, "… wherein the signal is a digital signal **from within a processing portion of the *RF circuit***, as further required by Claim 1. For this reason alone, or in combination with the reason set forth above, the 35 U.S.C. 103(a) rejection of Claim 1 is improper and must be reversed.

Examiner admits that Sunter fails to teach or suggest, "**wherein <u>the signal has a high degree of correlation with an RF output of the RF circuit</u>**," (OA, page 10, lines 9-10; OA, page 15, lines 18-19). Examiner, however, attempts to discount this omission in Sunter by arguing "however, the reference of Sunter does teach a PLL having a loop filter connected at the output of the phase comparator whereby suggesting that wherein the signal has a high degree of correlation with an RF output of the RF circuit (OA, page 10, lines 11-13; OA, page 16, lines 1-4)". Examiner's determination, however, confuses cause and effect. There is no teaching in Sunder that the RF output is the cause and the phase error is the effect.

Appellants further traverse Examiner's reliance (OA, page 10, lines 18-21; OA, page 16, lines 4-7) on the statement within Appellants' specification as teaching what is knowledge available to one having ordinary skill in the art. Appellants note that Examiner fails to identify the location of statement in Appellants' specification. Appellants respectfully note that the statement relied upon by Examiner is located in [0045] lines 10-13, which is in Appellants' Detailed Description of Illustrative Embodiments of the invention – NOT in the Backgound of the Invention. There is similarly no admission by Appellants that the respective teaching is knowledge available to one having ordinary skill in the art. As such, Examiner is not entitled to use this statement against Appellants in any obviousness rejection of Claims 1 & 25.

Further, regarding Claim 25, there is no teaching or suggestion in Sunter that PLL 10 is an "all digital" PLL. As such, Sunter further fails to teach or suggest, "**<u>a radio frequency (RF) circuit containing an all-digital phase-locked loop</u>** comprising: setting **<u>the all-digital phase-locked loop</u>**", as further required by Claim 25.

Appellants respectfully point out that any combination of Sunter and knowledge available to one having ordinary skill in the art fails to teach or suggest ALL of the elements of Claims 1 & 25, as is required by law. Moreover, "Skill in the art does not act as a bridge over gaps in the substantive presentation of an obviousness case, but instead supplies an important guarantee of objectivity in the process", *<u>Okajima v. Bourdeau</u>*, 261 F.3d 1350, 1355 (Fed. Cir. 2001)(<u>quoting</u>

Litton Industrial Prods., Inc. v. Solid State Systems Corp., 775 F.2d 158, 163 (Fed Cir. 1985). While KSR related some of the formalism of earlier decisions requiring a "teaching, suggestion, or motivation" to combine prior art references, it did not remove the need to anchor the analysis in explanation of how a person of ordinary skill would select and apply the teachings of the references. Obviousness is determined as a matter of foresight, not hindsight. See KSR at 421 (citing Graham, 383 U.S. at 36). KSR did not free the PTO's examination process from explaining its reasoning. In making an obviousness rejection, the examiner should not rely on conclusory statements that a particular feature of the invention would have been obvious or was well known. Instead, the examiner should elaborate, discussing the evidence or reasoning that leads the examiner to such a conclusion. Generally, the examiner cites prior art references to demonstrate the state of knowledge See *37 C.F.R. § 1.104(c)(2)* ("In rejecting claims for want of novelty or obviousness, the examiner must cite the best references at his or her command."); *Manual of Patent Examining Procedure (MPEP)* § 706.02 (8th ed., rev. July 2008). If an examiner is able to render a claim obvious simply by saying it is so, neither the Board of Appeals nor the Court of Appeals for the Federal Circuit is capable of reviewing that determination. See KSR, 550 U.S. at 418, citing *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)("[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness."). Accordingly, for all the reasons set forth above, the 35 U.S.C. 103(a) rejection of Claims 1 & 25 is improper and must be reversed.

Claim 2 further defines the method of claim 1, wherein the testing is performed using built-in self test (BIST) techniques. Claim 2 is allowable for the same reasons set forth above in support of the allowance of Claim 1.

Claim 3 further defines the method of claim 1, **wherein the signal is a phase error signal**. Claim 3 is allowable for the same reasons set forth above in support of the allowance of Claim 1. Moreover, as discussed previously, "Exor" is not a phase error signal.

Claim 5 further defines the method of claim 3, wherein a transfer function between the signal and the RF output phase is flat within a frequency band of interest. Claim 5 is allowable for the same reasons set forth above in support of the allowance of Claim 3. Moreover, Appellants disagree with Examiner's contention that one skilled in the art "would know that if the loop filter is designed in such as way (adjusting filter's parameters) so that the frequency of the error signal is within the cutoff frequency of the loop filter, then a high degree of correlation can be achieved between the error signal and the output signal". The purpose of Sunter's loop filter is different. The "Exor" output has a huge amount of quantization noise and the loop filter is simply needed to filter out that quantization noise. Furthermore, when a high degree of correlation is achieved the transfer function will be flat within a specific frequency range". At the time of the instant application, the knowledge that the digital PHE signal was highly correlated with the RF output phase, and their transfer function was flat, was not obvious.

Claim 6 further defines the method of claim 1, wherein the RF circuit is **an all-digital circuit**, and wherein the signal is an output of a component in **an all-digital phase-locked loop in the RF circuit**. Claim 6 is allowable for the same reasons set forth above in support of the allowance of Claim 1. Moreover, Sunter's Fig. 5 is NOT "an all-digital circuit". It is an analog circuit: See the Low pass filter 28 producing an analog tuning signal to VCO 22.

Claim 7 further defines the method of claim 6, wherein the signal **is an output of a phase detector**. Claim 7 is allowable for the same reasons set forth above in support of the allowance of Claim 6. Moreover, there is simply no teaching in Sunter that "Exor" signal is "an output of a phase detector", as suggested by Examiner.

Claim 8 further defines the method of claim 7, wherein the signal has been filtered. Claim 8 is allowable for the same reasons set forth above in support of the allowance of Claim 7.

Claim 9 further defines the method of claim 8, wherein **the all-digital phase-lock loop** is operating in a type-II mode, and the signal is an output of an integral accumulator of a loop filter.

Claim 9 is allowable for the same reasons set forth above in support of the allowance of Claim 8. Moreover, Sunter's Fig. 5 is NOT "an all-digital circuit". It is an analog circuit: See the Low pass filter 28 producing an analog tuning signal to VCO 22.

Claim 10 further defines the method of claim 8, wherein **the all-digital phase-lock loop** is operating in a type-I mode, and the signal is an output of **an infinite impulse response filter** coupled to the output of a loop filter. Claim 10 is allowable for the same reasons set forth above in support of the allowance of Claim 8. Moreover, Sunter's Fig. 5 is NOT "an all-digital circuit". It is an analog circuit: See the Low pass filter 28 producing an analog tuning signal to VCO 22. Further, there is no teaching in Sunter that low pass filter 28 is "an infinite impulse response filter". Examiner's determinations above are supposition not supported by fact.

Claim 11 further defines the method of claim 8, wherein a loop filter **coupled to an output of a phase detector** performs the filtering, and wherein the signal is an output of the loop filter. Claim 11 is allowable for the same reasons set forth above in support of the allowance of Claim 8. Moreover, there is no "phase detector" identified in Figs. 3 & 5 in PLL 10 as determined by Examiner. Examiner's determination above is supposition not supported by fact.

Claim 13 further defines the method of claim 1, wherein the frequency of the signal is several orders of magnitude less than the frequency of the RF output. Claim 13 is allowable for the same reasons set forth above in support of the allowance of Claim 1.

Claim 14 further defines the method of claim 1, wherein the test is **for phase error trajectory** and the signal is the output of a phase detector, and wherein the manipulation comprises measuring a change in the signal. Claim 14 is allowable for the same reasons set forth above in support of the allowance of Claim 1. Moreover, there is NO teaching in col. 8, lines 9-37, that its test is for "phase error trajectory", as determined by Examiner. Examiner's determination is supposition not supported by fact – little more than improper hindsight reconstruction.

Claim 15 further defines the method of claim 14, wherein the phase error trajectory is good when the change in the signal is less than a specified threshold. Claim 15 is allowable for the same reasons set forth above in support of the allowance of Claim 14.

Claim 16 further defines the method of claim 14, wherein the measuring the change in the signal **comprises measuring a peak, a variance, or a rate of change in the signal**. Claim 16 is allowable for the same reasons set forth above in support of the allowance of Claim 14. Moreover, the cited text by Examiner (col. 9, lines 54-56) is not relevant to Claim 16 being the teaching in Sunter discloses a method that introduces a delay to measure peak-to-peak jitter. It has nothing to do with "phase error trajectory".

Claim 17 further defines the method of claim 1, wherein the test is for frequency lock and the **signal is the output of a phase detector**, and wherein the manipulation comprises comparing a value of the signal over several samples. Claim 17 is allowable for the same reasons set forth above in support of the allowance of Claim 1. Moreover, Sunter's PLL 10 is NOT a phase detector. Similarly, signal "Exor" is NOT an output of PLL 10.

Claim 19 further defines the method of claim 17, wherein the samples are taken at different times. Claim 19 is allowable for the same reasons set forth above in support of the allowance of Claim 17.

Claim 20 further defines the method of claim 1, wherein the test **is for frequency deviation** and the signal is an output of an integral accumulator of a loop filter, and wherein the manipulation comprises comparing the signal with a specified range. Claim 20 is allowable for the same reasons set forth above in support of the allowance of Claim 1. Moreover, even if, arguendo, Sunter were to teach a "lock range" in Fig. 8, there is no further teaching that such "test" is "for frequency deviation". Accordingly, Examiner's determination is supposition not supported by fact – little more than improper hindsight reconstruction.

Claim 21 further defines the method of claim 20, wherein the frequency deviation is within acceptable limits when the signal is within the specified range. Claim 21 is allowable for the same reasons set forth above in support of the allowance of Claim 20.

Claim 22 further defines the method of claim 20, wherein the manipulation further comprises comparing several samples of the signal. Claim 22 is allowable for the same reasons set forth above in support of the allowance of Claim 20.

Claim 23 further defines the method of claim 20, wherein the RF circuit contains **an all-digital phase-locked loop** operating in a type-II mode. Claim 23 is allowable for the same reasons set forth above in support of the allowance of Claim 20. Moreover, item 20 in Fig. 3 of Sunter is an analog PLL – NOT an all-digital PLL.

Claim 27 further defines the method of claim 1, wherein the RF circuit is an **all-digital** frequency synthesizer. Claim 27 is allowable for the same reasons set forth above in support of the allowance of Claim 1. Moreover, Sunder's Fig. 5 discloses an analog PLL – NOT an "all-digital" frequency synthesizer.

Claim 28 further defines the method of claim 1, wherein the RF circuit is an **all-digital** transmitter. Claim 28 is allowable for the same reasons set forth above in support of the allowance of Claim 1. Moreover, Sunder's Fig. 5 discloses an analog device – NOT an "all-digital" device.

Claim 29 further defines the method of claim 28, wherein the transmitter is used in a wireless communications network. Claim 29 is allowable for the same reasons set forth above in support of the allowance of Claim 28.

Claim 31 further defines the method of claim 1, wherein the testing comprises a functional test or a compliance test of the RF circuit. Claim 31 is allowable for the same reasons

set forth above in support of the allowance of Claim 1. Appellants further traverse citation to Girardeau and Yamaguchi regarding Claim 24. The combination of these two references is not currently cited against Claim 24. Accordingly, the citation to Girardeau and Yamaguchi must be reversed.

2) Claim 24 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Sunter et al. (hereinafter Sunter), as applied to claim 1 above, and further in view of Wong et al. (hereinafter Wong)(US Patent 5,295,079). Appellants respectfully traverse this rejection as set forth below.

An obviousness inquiry is decided as a matter of law, based on four general factual inquiries as explained in *Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966), and reaffirmed in *KSR International, Inc. v. Teleflex, Inc.*, 550 U.S. 398, 406-07 (2007). The patent examiner is responsible for marshalling the references whose teachings are most relevant to the claimed invention, and evaluating the claimed invention against these teachings, from the viewpoint of a person of ordinary skill in the field of invention. See *Graham*, supra; *In re Kubin*, 561 F.3d 1351, 1355 (Fed. Cir. 2009); see generally *In re Oetiker*, 977 F.2d 1443, 1445-47 (Fed. Cir. 1992).

In proceedings before the Patent and Trademark Office, "the Examiner bears the burden of establishing a prima facie case of obviousness based upon the prior art". In re Fritch, 23 USPQ2d 1780, 1783 (Fed. Cir. 1992) (citing In re Piasecki, 745 F.2d 1468, 1471-72, 223 USPQ 785, 787-88 (Fed. Cir. 1984). "The Examiner can satisfy this burden **only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references**", In re Fritch, 23 USPQ2d 1780, 1783 (Fed. Cir. 1992)(citing In re Fine, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988)(citing In re Lalu, 747 F.2d 703, 705, 223 USPQ 1257, 1258 (Fed. Cir. 1988)).

Similarly, although couched in terms of combining teachings found in the prior art, the same inquiry must be carried out in the context of a purported obvious "modification" of the prior art. **The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification.** In re Gordon, 733 F.2d at 902, 221 USPQ at 1127. **Moreover, it is impermissible to use the claimed invention as an instruction manual or "template" to piece together the teachings of the prior art so that the claimed invention is rendered obvious.** In re Gorman, 933 F.2d 982, 987, 18 USPQ2d 1885, 1888 (Fed.Cir.1991). See also Interconnect Planning Corp. v. Feil, 774 F.2d 1132, 1138, 227 USPQ 543, 547 (Fed.Cir.1985).

Appellants respectfully point out that, "all words in a claim must be considered in judging the patentability of that claim the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970).

Claim 24 further defines the method of claim 1, wherein **the RF circuit** contains an **all-digital phase-locked loop**, and the method further comprises prior to the observing, setting the **all-digital phase-locked loop** to a certain bandwidth. Claim 24 is allowable for the same reasons set forth above in support of the allowance of Claim 1.

In their response to the rejection of Claim 1, Appellants clearly set forth that Sunter fails to teach or suggest an "RF" circuit. In addition to this, Appellants clearly set forth that Fig. 5 in Sunder discloses an analog PLL. Proof for this assertion: The analog loop filter providing an analog tuning voltage to the VCO.

Moreover, the text in Wong cited by Examiner does not teach "the method further comprises prior to the observing, setting the all-digital phase-locked loop to a certain bandwidth", as required by Claim 24. The text only mentions setting of various programmability modes, NOT bandwidths: "The loop filter also includes a loop configuration circuit which in response to the digital tester 4 programs and via the LCP 24 configures the loop type of the DUT

2. The DPLL, for example, provides for eight different types of loop configurations in a test mode (8 different combinations of close loop, open loop, and enable/disable proportional/integral paths) as shown in Table 1."

Appellants respectfully traverse Examiner's determination that, *"Wong does teach "the loop filter also includes a loop configuration circuit for configuring the loop type of the DUT (see col. 3, lines 19-25 & table 1)*(OA, page 17, lines 15-17)". Appellants respectfully respond that "loop type" is not a proper way of "setting the all-digital phase-locked loop to a certain bandwidth". Changing of loop type only introduces a pole at origin and does not control its bandwidth. At best, its effect would be parasitic or useless for a practical application. Moreover, no one of ordinary skill in the art would change the loop type to control the bandwidth. The Examiner must be required to point out an example where anybody would do such as thing! For the reasons set forth above, any combination of Sunder and Wong fails to teach or suggest all of the elements of Claim 24. The 35 U.S.C. 103(a) rejection of Claim 24 is erroneous and must be reversed.

3) Claims 32-40 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Wong et al. (US 5,295,079). Appellants respectfully traverse this rejection as set forth below.

An obviousness inquiry is decided as a matter of law, based on four general factual inquiries as explained in *Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966), and reaffirmed in *KSR International, Inc. v. Teleflex, Inc.*, 550 U.S. 398, 406-07 (2007). The patent examiner is responsible for marshalling the references whose teachings are most relevant to the claimed invention, and evaluating the claimed invention against these teachings, from the viewpoint of a person of ordinary skill in the field of invention. See *Graham*, supra; *In re Kubin*, 561 F.3d 1351, 1355 (Fed. Cir. 2009); see generally *In re Oetiker*, 977 F.2d 1443, 1445-47 (Fed. Cir. 1992).

In proceedings before the Patent and Trademark Office, "the Examiner bears the burden of establishing a prima facie case of obviousness based upon the prior art". In re Fritch, 23

USPQ2d 1780, 1783 (Fed. Cir. 1992) (citing In re Piasecki, 745 F.2d 1468, 1471-72, 223 USPQ 785, 787-88 (Fed. Cir. 1984). "The Examiner can satisfy this burden **only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references**", In re Fritch, 23 USPQ2d 1780. 1783 (Fed. Cir. 1992)(citing In re Fine, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988)(citing In re Lalu, 747 F.2d 703, 705, 223 USPQ 1257, 1258 (Fed. Cir. 1988)).

Similarly, although couched in terms of combining teachings found in the prior art, the same inquiry must be carried out in the context of a purported obvious "modification" of the prior art. **The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification.** In re Gordon, 733 F.2d at 902, 221 USPQ at 1127. Moreover, **it is impermissible to use the claimed invention as an instruction manual or "template" to piece together the teachings of the prior art so that the claimed invention is rendered obvious.** In re Gorman, 933 F.2d 982, 987, 18 USPQ2d 1885, 1888 (Fed.Cir.1991). See also Interconnect Planning Corp. v. Feil, 774 F.2d 1132, 1138, 227 USPQ 543, 547 (Fed.Cir.1985).

Appellants respectfully point out that, "all words in a claim must be considered in judging the patentability of that claim the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970).

Independent Claim 32 requires and positively recites, a circuit comprising: "a processor coupled to a radio frequency (RF) circuit, the processor containing circuitry to manipulate digital signals from the RF circuit **to provide a performance metric for the RF circuit**" and "**a control signal input coupled to the processor, wherein the control signal input can enable an observation and manipulation of the digital signals**".

In contrast, Wong describes a phase locked loop (PLL) nominally operating at 125 MHz for clock recovery of a 125 Mbits/s FDDI data. The PLL contains access ports connected to an I/O controller that interfaces with an external Tester 4. The PLL consists of a Phase Detector 10, Phase Error Processor (PEP) 12 performing phase error decimation and quantization and outputting 1-bit digital signal carrying UP/DOWN and Data_valid flag, Loop Filter 14 controlled by Loop Configuration Port (LCP) 24, Phase-to-Frequency Converter (PFC) 16 to generate a triangular wave of controllable frequency, and a Frequency Controlled Oscillator (FCO) 18. The FCO operates at two times the output frequency and is fed by equally-spaced 250 MHz clock and is followed by a divide-by-two 20 circuit. The loop filter integral signal couples with Frequency Access Port (FAP) 26. The accumulated ("sawtooth patterns") up/down bits are coupled with the Phase Access Port (PAP) 28. The PEP outputs are decimated by 44, so its output data rate as well as any other 'down-stream' circuit until the FCO is 125Mbps/44=2.84Mbps. The I/O controller link 6 connects the tester 4 with the LCP 24, FAP 26 and PAP 28.

Wong's system is engineered in such as way as to minimize the data rate accessible through the I/O controller. Hence, the phase detector 10 output is not accessible nor is the PEP 12 output – making them available (despite various technical difficulties) would not provide any substantial benefits. For the above reasons, Wong does not teach or suggest, **"a control signal input coupled to the processor, wherein the control signal input can enable an observation and manipulation of the digital signals."** The interface in Wong is asynchronous and there is simply no motivation to re-engineer the entire architecture, which in itself is non-obvious to one of average skill in the art at the time of the invention, to allow synchronous signal controls of sufficient speed, as suggested by Examiner.

Examiner counters arguing that Applicant is silent with regards to col. 3, lines 50-55 wherein Wong explicitly teaches that "the output of the digital integrator of the DPLL loop filter reflect the frequency difference between the local clock and the oncoming data to the DPLL. The integral signal content is accessible via the FAP 26 through which the digital tester can either read the error frequency" (OA, page 6, line 19 – page 7, line 2). Examiner thereafter agues

that "one skilled in the art would know that frequency and phase are related to one another" (OA, page 7, lines 2-3). Appellants respectfully respond that frequency is the differentiation of phase with respect to time. But what has it to do with the cited text? The "digital integrator of the DPLL loop filter" is not the same as the differential of phase, which is the frequency. Examiner uses completely different signals. The "frequency difference" signal in Wong rather reflects the property of the local clock, which is substantially static.

Moreover, Wong does not teach or suggest the limitation of "to provide a performance metric for the RF circuit", as further required by Claim 32. Wong teaches only testing and does not even suggest performance estimation. Moreover, the care abouts of testing are much different than with performance estimation. In Wong there is no motivation for the latter.

Appellants respectfully point out that any combination of Wong and knowledge available to one having ordinary skill in the art fails to teach or suggest ALL of the elements of Claim 32, as is required by law. Moreover, "Skill in the art does not act as a bridge over gaps in the substantive presentation of an obviousness case, but instead supplies an important guarantee of objectivity in the process", *Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001)(quoting *Litton Industrial Prods., Inc. v. Solid State Systems Corp.*, 775 F.2d 158, 163 (Fed Cir. 1985). While *KSR* related some of the formalism of earlier decisions requiring a "teaching, suggestion, or motivation" to combine prior art references, it did not remove the need to anchor the analysis in explanation of how a person of ordinary skill would select and apply the teachings of the references. Obviousness is determined as a matter of foresight, not hindsight. See *KSR* at 421 (citing Graham, 383 U.S. at 36). *KSR* did not free the PTO's examination process from explaining its reasoning. In making an obviousness rejection, the examiner should not rely on conclusory statements that a particular feature of the invention would have been obvious or was well known. Instead, the examiner should elaborate, discussing the evidence or reasoning that leads the examiner to such a conclusion. Generally, the examiner cites prior art references to demonstrate the state of knowledge See *37 C.F.R. § 1.104(c)(2)* ("In rejecting claims for want of novelty or obviousness, the examiner must cite the best references at his or her command.");

Manual of Patent Examining Procedure (MPEP) § 706.02 (8th ed., rev. July 2008). If an examiner is able to render a claim obvious simply by saying it is so, neither the Board of Appeals nor the Court of Appeals for the Federal Circuit is capable of reviewing that determination. See *KSR*, 550 U.S. at 418, citing *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)("[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness."). Accordingly, for all the reasons set forth above, the 35 U.S.C. 103(a) rejection of Claim 32 is improper and must be reversed.

Claim 33 further defines the circuit of claim 32 further comprising a latch coupled to the processor, the latch to store the performance metric provided by the processor. Claim 33 is allowable for the same reasons set forth above in support of the allowance of Claim 32.

Claim 34 further defines the circuit of claim 32, wherein the RF circuit is integrated onto a first integrated circuit, wherein the processor is integrated onto a second integrated circuit. Claim 34 is allowable for the same reasons set forth above in support of the allowance of Claim 32.

Claim 35 further defines the circuit of claim 34, wherein the first and the second integrated circuits **are the same integrated circuit**. Claim 35 is allowable for the same reasons set forth above in support of the allowance of Claim 34. Moreover, the IO controller in Wong is not the same as the "processor" of the instant invention. The Brain 4 in Fig. 2 is not integrated. There is no teaching or suggestion of integrating it.

Claim 36 further defines the circuit of claim 32, wherein the RF circuit contains an all-digital phase-locked loop, and wherein the processor is coupled to an output of a phase detector. Claim 36 is allowable for the same reasons set forth above in support of the allowance of Claim 32. Furthermore, Examiner is not correct in asserting that the processor in Wong "is coupled to an output of a phase detector". The tester 4, equated by Examiner to the processor, is coupled

only to LCP, FAP and PAP, with FAP being the closest to the output of the phase detector. The phase detector 10 output contains information of the phase error, which is the phase difference between the Din and P_CLK inputs to the phase detector. FAP 26 register, on the other hand, contains "the frequency difference between Din and the local clock generated by the local crystal" (col. 4, lines 60-62) – this is definitely not the phase error. Hence, the tester 4 is not coupled to the phase detector.

In addition to the above, Wong does not teach either an all-digital phase locked loop or coupling the processor to an output of a phase detector. First, the Fig. 2 circuit in Wong is not an "all digital circuit" (as required by the parent Claim 6), but rather a "very high frequency phase locked loop" with a number of analog components and signals. The Digital Loop Filter 14 in Wong does not operate on a digital phase error signal but analog UP/DOWN pulses in which the information is contained in the pulse widths. The analog nature of circuit 14 is described in col. 3 as "The loop filter 14 of the DPLL includes a scaler circuit, an <u>integrator</u> circuit, and a <u>summing</u> circuit <u>emulating</u> a 1-pole/1-zero digital loop filter". Thus, Wong does not teach either an all-digital phase locked loop or coupling the processor to an output of a phase detector Hence, Wong cannot be used as an obviating reference. Accordingly, the 35 U.S.C. 103(a) rejection of Claim 36 is improper and must be reversed.

Claim 37 further defines the circuit of claim 32, wherein the RF circuit contains an all-digital phase-locked loop, and wherein the processor is coupled to a filtered output of a phase detector. Claim 37 is allowable for the same reasons set forth above in support of the allowance of Claim 32.

Claim 38 further defines the circuit of claim 32, wherein the RF circuit contains an all-digital phase-locked loop, and wherein the processor is coupled to an output of a phase detector and a filtered output of a phase detector. Claim 38 is allowable for the same reasons set forth above in support of the allowance of Claim 32. Furthermore, Examiner is not correct in asserting that the processor in Wong "is coupled to an output of a phase detector". The tester 4, equated

by Examiner to the processor, is coupled only to LCP, FAP and PAP, with FAP being the closest to the output of the phase detector. The phase detector 10 output contains information of the phase error, which is the phase difference between the Din and P_CLK inputs to the phase detector. FAP 26 register, on the other hand, contains "the frequency difference between Din and the local clock generated by the local crystal" (col. 4, lines 60-62) – this is definitely not the phase error. Hence, the tester 4 is not coupled to the phase detector. Accordingly, the 35 U.S.C. 103(a) rejection is improper and must be reversed.

Claim 39 further defines the circuit of claim 32, wherein the circuit permits the testing of the RF circuit in wafer, in packaged integrated circuit, in factory, and in field. Claim 39 is allowable for the same reasons set forth above in support of the allowance of Claim 32. Moreover, Wong does not teach all four aspects of testing: "testing of the RF circuit in wafer, in packaged integrated circuit, in factory, and in field", as required by Claim 39. The text cited by Examiner discusses only a "cost efficient comprehensive testing" at IC level and communication board level. It mentions "in field servicing (on-site)", which simply implies a lab environment and is different from "in field" testing. The specification of the instant application describes ([0048] of the publication) "in field testing" as "testing can usually be done without the use of expensive laboratory equipment", and "the testing can be performed while the electronic device is in the end-user's hands". The system in Wong with the external test equipment 4 in Fig. 2 is simply not capable of "in-field testing". Accordingly, the 35 U.S.C. 103(a) rejection is improper and must be reversed.

Claim 40 further defines the circuit of claim 32, wherein the circuit permits the testing of the RF circuit, and wherein the testing is of a type selected from a group consisting of a phase trajectory error, a frequency lock, a frequency deviation, a phase noise power, or combinations thereof. Claim 40 is allowable for the same reasons set forth above in support of the allowance of Claim 32. Further, as stated already in other places, Wong does not teach or suggests testing of "phase trajectory error" since there is no frequency modulation capability. Similarly, Wong does not teach or suggests testing of "phase noise power". Measuring of a peak jitter does not

help with estimating the phase noise power. The instant application describes a method for estimating the phase noise power in paragraph [0058] and in Figure 9d. Accordingly, the 35 U.S.C. 103(a) rejection is improper and must be reversed.

4) Claims 41-44 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Staszewski et al. (hereinafter Staszewski)(US Publication 2002/0191727 A1), and further in view of Sunter et al. (hereinafter Sunter)(US Patent 6,396,889). Appellants respectfully traverse this rejection as set forth below.

An obviousness inquiry is decided as a matter of law, based on four general factual inquiries as explained in *Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966), and reaffirmed in *KSR International, Inc. v. Teleflex, Inc.*, 550 U.S. 398, 406-07 (2007). The patent examiner is responsible for marshalling the references whose teachings are most relevant to the claimed invention, and evaluating the claimed invention against these teachings, from the viewpoint of a person of ordinary skill in the field of invention. See *Graham*, supra; *In re Kubin*, 561 F.3d 1351, 1355 (Fed. Cir. 2009); see generally *In re Oetiker*, 977 F.2d 1443, 1445-47 (Fed. Cir. 1992).

In proceedings before the Patent and Trademark Office, "the Examiner bears the burden of establishing a prima facie case of obviousness based upon the prior art". In re Fritch, 23 USPQ2d 1780, 1783 (Fed. Cir. 1992) (citing In re Piasecki, 745 F.2d 1468, 1471-72, 223 USPQ 785, 787-88 (Fed. Cir. 1984). "The Examiner can satisfy this burden **only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references**". In re Fritch, 23 USPQ2d 1780, 1783 (Fed. Cir. 1992)(citing In re Fine, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988)(citing In re Lalu, 747 F.2d 703, 705, 223 USPQ 1257, 1258 (Fed. Cir. 1988)).

Similarly, although couched in terms of combining teachings found in the prior art, the same inquiry must be carried out in the context of a purported obvious "modification" of the prior art. **The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification.** In re Gordon, 733 F.2d at 902, 221 USPQ at 1127. Moreover, **it is impermissible to use the claimed invention as an instruction manual or "template" to piece together the teachings of the prior art so that the claimed invention is rendered obvious.** In re Gorman, 933 F.2d 982, 987, 18 USPQ2d 1885, 1888 (Fed.Cir.1991). See also Interconnect Planning Corp. v. Feil, 774 F.2d 1132, 1138, 227 USPQ 543, 547 (Fed.Cir.1985).

Appellants respectfully point out that, "all words in a claim must be considered in judging the patentability of that claim the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970).

Claim 41 requires and positively recites, a circuit comprising: "a reference phase accumulator coupled to a signal input, the reference phase accumulator containing circuitry to compute a reference phase", "a phase detector coupled to the reference phase accumulator, the **phase detector containing circuitry to compute a difference between the reference phase and a variable phase**", "a digitally-controlled oscillator (DCO) coupled to the phase detector, **wherein the performance of the DCO can be ascertained by a test circuit outside of the circuit observing an output of the phase detector, wherein the test circuit manipulates the observed output and generates a performance metric for the DCO based, at least in part, on the manipulation**" and "a variable phase accumulator coupled to the DCO and the phase detector, **the variable phase accumulator containing circuitry to compute the variable phase**".

Claim 44 requires and positively recites, a circuit comprising: "a reference phase accumulator coupled to a signal input, the reference phase accumulator containing circuitry to compute a reference phase", "a phase detector coupled to the reference phase accumulator, the

phase detector containing circuitry to compute a difference between the reference phase and a variable phase", "a digitally-controlled oscillator (DCO) coupled to the phase detector, **wherein the performance of the DCO can be ascertained by a test circuit outside of the circuit observing an output of the phase detector, wherein the test circuit manipulates the observed output and generates a performance metric for the DCO based, at least in part, on the manipulation**", "a variable phase accumulator coupled to the DCO and the phase detector, **the variable phase accumulator containing circuitry to compute the variable phase**" and "a loop filter coupled to the phase detector and the DCO, the loop filter to provide a desired amount of attenuation to the computed difference between the reference phase_and the variable phase, **wherein the loop filter is of a type selected from a group consisting of a finite impulse response filter, an infinite impulse response filter or combination thereof**".

Staszewski does not teach "**wherein the performance of the DCO can be ascertained by a test circuit outside of the circuit observing an output of the phase detector, wherein the test circuit manipulates the observed output and generates a performance metric for the DCO based, at least in part, on the manipulation**" limitation, as required by Claims 41 & 44. Examiner agrees (OA, page 21, lines 15-19). Examiner, however, relies upon Sunter for this omitted teaching in Staszewski. Examiner argues that Sunter's Figs. 5 & 11 teach that "wherein the performance of the DCO can be ascertained by a test circuit outside of the circuit observing an output of the phase detector, wherein the test circuit manipulates the observed output and generates a performance metric for the DCO based, at least in part, on the manipulation (OA, page 21, line 20 – page 22, line 3).

Appellants respectfully traverse Examiner's above determination. Sunter does NOT teach an all-digital PLL, merely an *analog* PLL. Fig 5 shows a VCO, not a DCO. The VCO has an analog tuning input. Therefore Sunder does not teach or suggest a "DCO". Further, Sunter does not teach or suggest "a phase detector". As such, Sunter fails to teach or suggest, "a phase detector coupled to the reference phase accumulator, the **phase detector containing circuitry to compute a difference between the reference phase and a variable phase**", "a digitally-

controlled oscillator (DCO) coupled to the phase detector, **wherein the performance of the DCO can be ascertained by a test circuit outside of the circuit observing an output of the phase detector, wherein the test circuit manipulates the observed output and generates a performance metric for the DCO based, at least in part, on the manipulation**", as required by Claims 41 & 44.

In light of the above, any combination of Staszewski and Sunter fails to teach or suggest. "**wherein the performance of the DCO can be ascertained by a test circuit outside of the circuit observing an output of the phase detector, wherein the test circuit manipulates the observed output and generates a performance metric for the DCO based, at least in part, on the manipulation**" limitation, as required by Claims 41 & 44.

In addition to the above, Examiner admits that Staszewski fails to teach "a loop filter coupled to the phase detector and the DCO, the loop filter to provide a desired amount of attenuation to the computed difference between the reference phase and the variable phase, **wherein the loop filter is of a type selected from a group consisting of a finite impulse response filter, an infinite impulse response filter or combination thereof**", as further required by Claim 44 (OA, page 23, lines 7-11). Examiner, however, proceeds to argue that the above high-lighted limitation is "inherent" in Staszewski (OA, page 23, lines 15-18).

Appellants respectfully traverse Examiner's "inherency" determination. "To establish inherency, the extrinsic evidence 'must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill.' ... 'Inherency however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient". *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999). "In relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art." *Ex parte Levy*, 17

USPQ2d 1461, 1464 (Bd. Pat. App. & Int'f 1990). "A prior art reference anticipates a claim only if the reference discloses, either expressly or inherently, every limitation of the claim."; "About the most that can be said for the [prior art] patent is that it does not explicitly describe anything inconsistent with [the claimed] procedures. However, this negative pregnant is no enough to show anticipation." *Rowe v. Dror*, 112 F.3d 473, 478, 480-81, 42 USPQ2d 1550, 1553, 1555 (Fed. Cir. 1997). Summary judgment of inherency anticipation was improper because of a material fact issue whether a prior art reference's process necessarily produced the claimed invention's features; "To serve as an anticipation when the reference is silent about the asserted inherent characteristic, such gap in the reference may be filled with recourse to extrinsic evidence. Such evidence must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill". *Continental Can Company USA, Inc. v. Monsanto Co.*, 948 F.2d 1264, 1269, 20 USPQ2d 1746, 1749-50 (Fed. Cir. 1991). The extrinsic evidence offered up by Examiner fails to make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Accordingly, Examiner's "inherency" argument is improper and must be summarily dismissed.

Accordingly, for all the reasons set forth above, the 35 U.S.C. 103(a) rejection of Claims 41 & 44 is improper and must be reversed.

Claim 42 further defines the circuit of claim 41 further comprising a time-to-digital converter (TDC) coupled to the DCO and the phase detector, the TDC containing circuitry to compute a time difference between a reference clock and a variable clock. Claim 42 is allowable for the same reasons set forth above in support of the allowance of Claim 41.

Claim 43 further defines the circuit of claim 41 further comprising a loop filter coupled to the phase detector and the DCO, the loop filter to provide a desired amount of attenuation to the computed difference between the reference phase and the variable phase. Claim 43 is allowable for the same reasons set forth above in support of the allowance of Claim 41.

5) Claims 48-50 and 52-54 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al (hereinafter Kim)(US Patent 6,885,700 B1) in view of Ortiz Perez et al (hereinafter Perez)(US Patent 5,966,428). Appellants respectfully traverse this rejection as set forth below.

An obviousness inquiry is decided as a matter of law, based on four general factual inquiries as explained in *Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966), and reaffirmed in *KSR International, Inc. v. Teleflex, Inc.*, 550 U.S. 398, 406-07 (2007). The patent examiner is responsible for marshalling the references whose teachings are most relevant to the claimed invention, and evaluating the claimed invention against these teachings, from the viewpoint of a person of ordinary skill in the field of invention. See *Graham*, supra; *In re Kubin*, 561 F.3d 1351, 1355 (Fed. Cir. 2009); see generally *In re Oetiker*, 977 F.2d 1443, 1445-47 (Fed. Cir. 1992).

In proceedings before the Patent and Trademark Office, "the Examiner bears the burden of establishing a prima facie case of obviousness based upon the prior art". In re Fritch, 23 USPQ2d 1780, 1783 (Fed. Cir. 1992) (citing In re Piasecki, 745 F.2d 1468, 1471-72, 223 USPQ 785, 787-88 (Fed. Cir. 1984). "The Examiner can satisfy this burden **only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references**", In re Fritch, 23 USPQ2d 1780, 1783 (Fed. Cir. 1992)(citing In re Fine, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988)(citing In re Lalu, 747 F.2d 703, 705, 223 USPQ 1257, 1258 (Fed. Cir. 1988)).

Similarly, although couched in terms of combining teachings found in the prior art, the same inquiry must be carried out in the context of a purported obvious "modification" of the prior art. **The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification.** In re Gordon, 733 F.2d at 902, 221 USPQ at 1127. Moreover, **it is impermissible to use the claimed invention as an instruction manual or "template" to piece together the**

teachings of the prior art so that the claimed invention is rendered obvious. In re Gorman, 933 F.2d 982, 987, 18 USPQ2d 1885, 1888 (Fed.Cir.1991). See also Interconnect Planning Corp. v. Feil, 774 F.2d 1132, 1138, 227 USPQ 543, 547 (Fed.Cir.1985).

Appellants respectfully point out that, "all words in a claim must be considered in judging the patentability of that claim the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970).

Claim 48 requires and positively recites, a method for operating a cellular phone, comprising: "**performing built-in self-test (BIST) on a parameter associated with the cellular phone**" and "reporting to a cellular service provider through a wireless medium when the BIST reports the parameter to be degraded beyond a limit".

Examiner admits that Kim fails to teach or suggest, "reporting to a cellular service provider through a wireless medium when the BIST reports the parameter to be degraded beyond a limit" (OA, page 24, line 21 – page 25, line 2). Examiner relies instead on Perez to provide this teaching (OA, page 25, lines 3-6). But even if, arguendo, Perez provides this teaching, Examiner misinterprets the remaining teaching of Kim. In actuality, Kim describes fault testing of a PLL, which is a narrow area well defined in the arts. To cite from Kim: "structural and defect-oriented testing" (Abstract), "defect-oriented testing" (col. 2, line 10). Kim does not teach performance testing associated with a cellular phone, nor does it even go beyond the PLL, which is merely a small building block of a cell phone. Moreover, Kim does not teach "performing BIST on a PLL *in order to determine its performance*", as argued by Examiner (OA, page 8, lines 6-7). As such, Kim does not teach "performing built-in self-test (BIST) on a parameter associated with the cellular phone", as required by Claim 48.

Therefore, even if, arguendo, Perez were to teach what Examiner proposes, the combination of Kim and Perez yet fails to teach or suggest, "**performing built-in self-test (BIST) on a parameter associated with the cellular phone**", as required by Claim 48.

Appellants further traverse Examiner's determination that, Perez discloses *"a self-diagnostic system for checking all functions of a cellular-transceiver (abstract, col. 5, line 26 – col. 6, line 15)(OA, page 25, lines 3-4), and reporting the results to an off-site monitoring center by means of the cellular network (OA, page 25, lines 5-6).* At best, Perez teaches basic fault testing, but NOT "**built-in self-test (BIST) <u>on a parameter associated with the cellular phone</u>**", as required by Claim 48. Examiner responds by pointing to col. 3, lines 50-67 as teaching the concept of using a self-diagnostic system for checking all functions of a cellular-transceiver system and reporting the result to an off-site monitoring center (OA, page 9, lines 2-5). However, the citation point to by Examiner is a generic statement within the "Summary of the Invention" that is "an *objective* of the invention" – which is little more than a wish list of desired attributes – which is little more than supposition not supported by fact. Examiner has yet identified no evidence in Kim that teaches "**built-in self-test (BIST) <u>on a parameter associated with the cellular phone</u>**", as required by Claim 48.

Appellants respectfully point out that any combination of Kim and Perez fails to teach or suggest ALL of the elements of Claim 48, as is required by law. Moreover, "Skill in the art does not act as a bridge over gaps in the substantive presentation of an obviousness case, but instead supplies an important guarantee of objectivity in the process", *<u>Okajima v. Bourdeau</u>*, 261 F.3d 1350, 1355 (Fed. Cir. 2001)(<u>quoting *Litton Industrial Prods., Inc. v. Solid State Systems Corp.*</u>, 775 F.2d 158, 163 (Fed Cir. 1985). While *<u>KSR</u>* related some of the formalism of earlier decisions requiring a "teaching, suggestion, or motivation" to combine prior art references, it did not remove the need to anchor the analysis in explanation of how a person of ordinary skill would select and apply the teachings of the references. Obviousness is determined as a matter of foresight, not hindsight. <u>See</u> *<u>KSR</u>* at 421 (citing Graham, 383 U.S. at 36). *<u>KSR</u>* did not free the PTO's examination process from explaining its reasoning. In making an obviousness rejection, the examiner should not rely on conclusory statements that a particular feature of the invention would have been obvious or was well known. Instead, the examiner should elaborate, discussing the evidence or reasoning that leads the examiner to such a conclusion. Generally, the examiner cites prior art references to demonstrate the state of knowledge See *<u>37 C.F.R. § 1.104(c)(2)</u>* ("In

rejecting claims for want of novelty or obviousness, the examiner must cite the best references at his or her command."); *Manual of Patent Examining Procedure (MPEP)* § 706.02 (8th ed., rev. July 2008). If an examiner is able to render a claim obvious simply by saying it is so, neither the Board of Appeals nor the Court of Appeals for the Federal Circuit is capable of reviewing that determination. See *KSR*, 550 U.S. at 418, citing *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)("[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness."). Accordingly, for all the reasons set forth above, the 35 U.S.C. 103(a) rejection of Claim 48 is improper and must be reversed.

Claim 49 further defines the method of claim 48, wherein the performing step is done on power-up of the cellular phone. Claim 49 is allowable for the same reasons set forth above in support of the allowance of Claim 48.

Claim 50 further defines the method of claim 48, wherein the parameter is an RF system parameter. Claim 50 is allowable for the same reasons set forth above in support of the allowance of Claim 48. Moreover, Wong does not teach "wherein the parameter is an RF system parameter" (as required by Claim 50) "associated with the cellular phone" (as required by the parent Claim 48). As argued above, Kim teaches only a fault testing of a PLL, which is different from an RF system parameter of a cellular phone.

Claim 52 further defines the method of claim 48, further comprising a step of notifying a user of the cellular phone that the parameter is degraded beyond a limit. Claim 52 is allowable for the same reasons set forth above in support of the allowance of Claim 48. Moreover, Perez does not teach reporting the results to the user. Perez only describes reporting the results to an off-site monitoring center.

Claim 53 further defines the method of claim 52, wherein the notifying step is done wirelessly. Claim 53 is allowable for the same reasons set forth above in support of the allowance of Claim 52.

Claim 54 further defines the method of claim 52, wherein the notifying step is done through a service bill. Claim 52 stands allowable for the same reasons set forth above in support of the allowance of Claim 52.

6) Claim 51 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al (hereinafter Kim)(US Patent 6,885,700 B1) and Ortiz Perez et al (hereinafter Perez)(US Patent 5,966,428), as applied to claim 48 above, and further in view of Reddy et al. (hereinafter Reddy)(US Patent 6,636,979 B1). Appellants respectfully traverse this rejection as set forth below.

Claim 51 further defines the method of claim 50, wherein the RF system parameter is a distortion in a phase error trajectory. Claim 51 stands allowable for the same reasons set forth above. Moreover, Reddy does not teach "phase error trajectory" of a data transmission, as suggested by Examiner. Reddy merely describes "measuring phase error between two clocks" (col. 5, lines 58-65), which is different. For example, Fig. 5 configuration in Reddy uses a PLL to synthesize a single frequency carrier. The modulation is not taught. Without modulation, there is no "phase error trajectory". As such, any combination of Kim, Perez and Reddy fails to teach or suggest all of the elements of Claim 51. The, the 35 U.S.C. 103(a) rejection is improper and must be reversed.

7) Claim 1 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Wong et at. (hereinafter Wong)(US Patent 5,295,079). Appellants respectfully traverse this rejection as set forth below.

An obviousness inquiry is decided as a matter of law, based on four general factual inquiries as explained in *Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966), and reaffirmed in *KSR International, Inc. v. Teleflex, Inc.*, 550 U.S. 398, 406-07 (2007). The patent examiner is responsible for marshalling the references whose teachings are most relevant to the claimed invention, and evaluating the claimed invention against these teachings, from the viewpoint of a person of ordinary skill in the field of invention. See *Graham*, supra; *In re Kubin*, 561 F.3d 1351, 1355 (Fed. Cir. 2009); see generally *In re Oetiker*, 977 F.2d 1443, 1445-47 (Fed. Cir. 1992).

In proceedings before the Patent and Trademark Office, "the Examiner bears the burden of establishing a prima facie case of obviousness based upon the prior art". In re Fritch, 23 USPQ2d 1780, 1783 (Fed. Cir. 1992) (citing In re Piasecki, 745 F.2d 1468, 1471-72, 223 USPQ 785, 787-88 (Fed. Cir. 1984). "The Examiner can satisfy this burden **only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references**", In re Fritch, 23 USPQ2d 1780, 1783 (Fed. Cir. 1992)(citing In re Fine, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988)(citing In re Lalu, 747 F.2d 703, 705, 223 USPQ 1257, 1258 (Fed. Cir. 1988)).

Similarly, although couched in terms of combining teachings found in the prior art, the same inquiry must be carried out in the context of a purported obvious "modification" of the prior art. **The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification.** In re Gordon, 733 F.2d at 902, 221 USPQ at 1127. Moreover, **it is impermissible to use the claimed invention as an instruction manual or "template" to piece together the teachings of the prior art so that the claimed invention is rendered obvious.** In re Gorman, 933 F.2d 982, 987, 18 USPQ2d 1885, 1888 (Fed.Cir.1991). See also Interconnect Planning Corp. v. Feil, 774 F.2d 1132, 1138, 227 USPQ 543, 547 (Fed.Cir.1985).

Appellants respectfully point out that, "all words in a claim must be considered in judging the patentability of that claim the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970).

Claim 1 requires and positively recites, a **method for *testing a radio frequency (RF)* circuit** comprising: "observing a signal **from the *RF circuit***, wherein the signal is a digital signal **from within a processing portion of the *RF circuit*, wherein the signal has a high degree of correlation with an RF output of the *RF circuit***, and wherein the observing occurs outside of the RF circuit", "manipulating the signal outside of the RF circuit" and "producing a metric for the *test* outside of the RF circuit based on results from the manipulating".

In contrast, Wong discloses a digital testing system providing for cost efficient comprehensive testing of *very high frequency* phase-locked loop performance parameters (Abstract, lines 1-3). Wong goes on to disclose that by "very high frequency", it means "optical frequencies". Fig. 2 discloses an optical receiver 9, which receives, for example, a 125 MBits/S optical input and converts it into an electrical digital signal Din at its output (col. 2, lines 48-50). But Appellants respectfully point out that "optical" frequencies are outside the radio frequency range. Nowhere is there any teaching whatsoever in Wong that its testing system can be used for testing of radio frequency (RF) signals, as determined by Examiner (OA, page 27, line 19 – page 28, line 6). The following dictionary definitions for the term "radio frequency" confirm the understanding one having ordinary skill in the art would understand the term to mean:

> **Radio frequency (RF).** Those *frequencies* of the *electromagnetic spectrum* that are normally associated with *radio-wave propagation*. The nomenclature of radio frequencies is as follows:

Frequency Subdivision	Frequency Range	Metric Subdivision
VLF	3-30 KHz	myriametric waves
LF	30-300 KHz	kilometric waves
MF	300-3000 KHz	hectometric waves
HF	3-30 MHz	decametric waves
VHF	30-300 MHz	metric waves

UHF	300-3000 MHz	decimetric waves
SHF	3-30 GHz	centimetric waves
EHF	30-300 GHz	millimetric waves
THF	300-3000 GHz	decimillimetric waves

(Communications Standard Dictionary, Second Edition, 1989)(Attachment-1).

> Radio frequency (1) (A) (data transmission) (Loosely) The frequency in the **portion of the electromagnetic spectrum is *between the audio-frequency portion and the infrared portion*.** (B) (data transmission) A frequency useful for radio transmission. Note: The present practicable limits of radio frequency are roughly 10 KHz (kilohertz) to 100,000 MHz (megahertz). Within this frequency range electromagnetic radiation may be detected and amplified as an electric current at the wave frequency. (The IEEE Standard Dictionary of Electrical and Electronics Terms, Sixth Edition (1996)(Attachment-2).

Thus, one having ordinary skill in the art would under stand the term "radio frequency (RF)" to be: those frequencies of the electromagnetic spectrum that are normally associated with radio-wave propagation (i.e., the electromagnetic spectrum between the audio-frequency portion and the infrared portion).

Contrary to Examiner's determination, there is no teaching whatsoever in Wong that his digital testing technique for very high frequency phase-locked loops is, or can be applicable, to radio frequency circuits. The terms "radio frequency" and "rf" are not set forth anywhere in Wong's specification. Moreover, no frequency ranges are identified that could be implied to be associated with a "radio frequency" range. As such, Wong fails to teach or suggest, "a **method for *testing a radio frequency (RF)* circuit**", as required by Claim 1.

Further, being that Wong fails to teach or suggest, "a **method for *testing a radio frequency (RF)* circuit**", as required by Claim 1, by definition it further fails to teach or suggest, "observing a signal **from the *RF circuit***, wherein the signal is a digital signal **from within a processing portion of the *RF circuit*, wherein the signal has a high degree of correlation with an RF output of the RF circuit**, as further required by Claim 1.

Examiner argues that the claim limitation: "a method for *testing a radio frequency (RF)* circuit". "observing a signal from the *RF circuit*", is taught in Figs. 2, 4 26 & col. 1, lines 42-60 & col. 3, liens 50-55 (OA, page 27, line 19 – page 28, line 1). Appellants respectfully point out that there is no Fig. 26 in Wong. Fig. 4 illustrates nothing more than signal diagrams for receive clock (RXC) jitter measurements – there is no teaching of any circuits, much less RF circuits, in Fig. 4. Remaining Fig. 2 discloses a block diagram of digital test system for received optical (and NOT rf) signals (note optical receiver 9 & the lack of any antenna or circuit identified as being "rf"). Accordingly, Examiner's determination is supposition not supported by fact - little more than improper hindsight reconstruction. For this reason alone, the 35 U.S.C. 103(a) rejection of Claim 1 is improper and must be reversed.

Examiner next argues that Sunter teaches the claim limitation "wherein the signal is a digital signal from within a processing portion of the RF circuit (see Fig. 2)(OA, page 28, lines 1-2). However, reference to Fig. 2 shows that there is no "RF receiver" in Fig. 2. As such, Wong fails to teach or suggest, "… wherein the signal is a digital signal **from within a processing portion of the *RF circuit***, as further required by Claim 1. For this reason alone, or in combination with the reason set forth above, the 35 U.S.C. 103(a) rejection of Claim 1 is improper and must be reversed.

Examiner admits that Wong fails to teach or suggest, "**wherein the signal has a high degree of correlation with an RF output of the RF circuit**," (OA, page 28, lines 7-8). Examiner, however, attempts to discount this omission in Wong by arguing "however, the reference of Wong does teach a PLL having a loop filter connected at the output of the phase comparator whereby suggesting that wherein the signal has a high degree of correlation with an RF output of the RF circuit (OA, page 28, lines 9-11)". Examiner's determination, however, confuses cause and effect. There is no teaching in Wong that the output is RF and that it is the cause and the phase error is the effect.

Appellants further traverse Examiner's reliance (OA, page 28, lines 15-18) on the statement within Appellants' specification as teaching what is knowledge available to one having ordinary skill in the art. Appellants note that Examiner fails to identify the location of statement in Appellants' specification. Appellants respectfully note that the statement relied upon by Examiner is located in [0045] lines 10-13, which is in Appellants' Detailed Description of Illustrative Embodiments of the invention – NOT in the Backgound of the Invention. There is similarly no admission by Appellants that the respective teaching is knowledge available to one having ordinary skill in the art. As such, Examiner is not entitled to use this statement against Appellants in any obviousness rejection of Claim 1.

Appellants respectfully point out that any combination of Wong and knowledge available to one having ordinary skill in the art fails to teach or suggest ALL of the elements of Claim 1, as is required by law. Moreover, "Skill in the art does not act as a bridge over gaps in the substantive presentation of an obviousness case, but instead supplies an important guarantee of objectivity in the process", *Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001)(quoting *Litton Industrial Prods., Inc. v. Solid State Systems Corp.*, 775 F.2d 158, 163 (Fed Cir. 1985). While *KSR* related some of the formalism of earlier decisions requiring a "teaching, suggestion, or motivation" to combine prior art references, it did not remove the need to anchor the analysis in explanation of how a person of ordinary skill would select and apply the teachings of the references. Obviousness is determined as a matter of foresight, not hindsight. See *KSR* at 421 (citing Graham, 383 U.S. at 36). *KSR* did not free the PTO's examination process from explaining its reasoning. In making an obviousness rejection, the examiner should not rely on conclusory statements that a particular feature of the invention would have been obvious or was well known. Instead, the examiner should elaborate, discussing the evidence or reasoning that leads the examiner to such a conclusion. Generally, the examiner cites prior art references to demonstrate the state of knowledge See *37 C.F.R. § 1.104(c)(2)* ("In rejecting claims for want of novelty or obviousness, the examiner must cite the best references at his or her command."); *Manual of Patent Examining Procedure (MPEP)* § 706.02 (8th ed., rev. July 2008). If an examiner is able to render a claim obvious simply by saying it is so, neither the Board of Appeals

nor the Court of Appeals for the Federal Circuit is capable of reviewing that determination. See *KSR*, 550 U.S. at 418, citing *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)("[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness."). Accordingly, for all the reasons set forth above, the 35 U.S.C. 103(a) rejection of Claim 1 is improper and must be reversed.

For the above reasons, favorable consideration of the appeal of the Final Rejection in the above-referenced application, and its reversal, are respectfully requested.

Respectfully submitted,

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CLAIMS APPENDIX

CLAIMS ON APPEAL:

1. A method for testing a radio frequency (RF) circuit comprising:

observing a signal from the RF circuit, wherein the signal is a digital signal from within a processing portion of the RF circuit, wherein the signal has a high degree of correlation with an RF output of the RF circuit, and wherein the observing occurs outside of the RF circuit;

manipulating the signal outside of the RF circuit; and

producing a metric for the test outside of the RF circuit based on results from the manipulating.

2. The method of claim 1, wherein the testing is performed using built-in self test (BIST) techniques.

3. The method of claim 1, wherein the signal is a phase error signal.

5. The method of claim 3, wherein a transfer function between the signal and the RF output phase is flat within a frequency band of interest.

6. The method of claim 1, wherein the RF circuit is an all-digital circuit, and wherein the signal is an output of a component in an all-digital phase-locked loop in the RF circuit.

7. The method of claim 6, wherein the signal is an output of a phase detector.

8. The method of claim 7, wherein the signal has been filtered.

9. The method of claim 8, wherein the all-digital phase-lock loop is operating in a type-II mode, and the signal is an output of an integral accumulator of a loop filter.

11. The method of claim 8, wherein a loop filter coupled to an output of a phase detector performs the filtering, and wherein the signal is an output of the loop filter.

13. The method of claim 1, wherein the frequency of the signal is several orders of magnitude less than the frequency of the RF output.

14. The method of claim 1, wherein the test is for phase error trajectory and the signal is the output of a phase detector, and wherein the manipulation comprises measuring a change in the signal.

15. The method of claim 14, wherein the phase error trajectory is good when the change in the signal is less than a specified threshold.

16. The method of claim 14, wherein the measuring the change in the signal comprises measuring a peak, a variance, or a rate of change in the signal.

17. The method of claim 1, wherein the test is for frequency lock and the signal is the output of a phase detector, and wherein the manipulation comprises comparing a value of the signal over several samples.

19. The method of claim 17, wherein the samples are taken at different times.

20. The method of claim 1, wherein the test is for frequency deviation and the signal is an output of an integral accumulator of a loop filter, and wherein the manipulation comprises comparing the signal with a specified range.

21. The method of claim 20. wherein the frequency deviation is within acceptable limits when the signal is within the specified range.

22. The method of claim 20, wherein the manipulation further comprises comparing several samples of the signal.

23. The method of claim 20, wherein the RF circuit contains an all-digital phase-locked loop operating in a type-II mode.

24. The method of claim 1, wherein the RF circuit contains an all-digital phase-locked loop, and the method further comprises prior to the observing, setting the all-digital phase-locked loop to a certain bandwidth.

25. A method for testing a radio frequency (RF) circuit containing an all-digital phase-locked loop comprising:

setting the all-digital phase-locked loop to a certain bandwidth;

observing a signal from the RF circuit, wherein the signal is a digital signal from within a processing portion of the RF circuit, wherein the signal has a high degree of correlation with an RF output of the RF circuit, and wherein the observing occurs outside of the RF circuit;

manipulating the signal outside of the RF circuit; and

producing a metric for the test outside of the RF circuit based on results from the manipulating, wherein the test is for estimating phase noise power and the signal is an

output of a phase detector, and wherein the manipulating comprises calculating a mean square error of the signal.

27. The method of claim 1, wherein the RF circuit is an all-digital frequency synthesizer.

28. The method of claim 1, wherein the RF circuit is an all-digital transmitter.

29. The method of claim 28, wherein the transmitter is used in a wireless communications network.

30. The method of claim 29, wherein the wireless communications network is Bluetooth compliant.

31. The method of claim 1, wherein the testing comprises a functional test or a compliance test of the RF circuit.

32. A circuit comprising:

a processor coupled to a radio frequency (RF) circuit, the processor containing circuitry to manipulate digital signals from the RF circuit to provide a performance metric for the RF circuit; and

a control signal input coupled to the processor, wherein the control signal input can enable an observation and manipulation of the digital signals.

33. The circuit of claim 32 further comprising a latch coupled to the processor, the latch to store the performance metric provided by the processor.

34. The circuit of claim 32, wherein the RF circuit is integrated onto a first integrated circuit, wherein the processor is integrated onto a second integrated circuit.

35. The circuit of claim 34, wherein the first and the second integrated circuits are the same integrated circuit.

36. The circuit of claim 32, wherein the RF circuit contains an all-digital phase-locked loop, and wherein the processor is coupled to an output of a phase detector.

37. The circuit of claim 32, wherein the RF circuit contains an all-digital phase-locked loop, and wherein the processor is coupled to a filtered output of a phase detector.

38. The circuit of claim 32, wherein the RF circuit contains an all-digital phase-locked loop, and wherein the processor is coupled to an output of a phase detector and a filtered output of a phase detector.

39. The circuit of claim 32, wherein the circuit permits the testing of the RF circuit in wafer, in packaged integrated circuit, in factory, and in field.

40. The circuit of claim 32, wherein the circuit permits the testing of the RF circuit, and wherein the testing is of a type selected from a group consisting of a phase trajectory error, a frequency lock, a frequency deviation, a phase noise power, or combinations thereof.

41. A circuit comprising:

a reference phase accumulator coupled to a signal input, the reference phase accumulator containing circuitry to compute a reference phase;

a phase detector coupled to the reference phase accumulator, the phase detector

containing circuitry to compute a difference between the reference phase and a variable phase;

a digitally-controlled oscillator (DCO) coupled to the phase detector, wherein the performance of the DCO can be ascertained by a test circuit outside of the circuit observing an output of the phase detector, wherein the test circuit manipulates the observed output and generates a performance metric for the DCO based, at least in part, on the manipulation; and

a variable phase accumulator coupled to the DCO and the phase detector, the variable phase accumulator containing circuitry to compute the variable phase.

42. The circuit of claim 41 further comprising a time-to-digital converter (TDC) coupled to the DCO and the phase detector, the TDC containing circuitry to compute a time difference between a reference clock and a variable clock.

43. The circuit of claim 41 further comprising a loop filter coupled to the phase detector and the DCO, the loop filter to provide a desired amount of attenuation to the computed difference between the reference phase and the variable phase.

44. A circuit comprising:

a reference phase accumulator coupled to a signal input, the reference phase accumulator containing circuitry to compute a reference phase;

a phase detector coupled to the reference phase accumulator, the phase detector containing circuitry to compute a difference between the reference phase and a variable phase;

a digitally-controlled oscillator (DCO) coupled to the phase detector, wherein the performance of the DCO can be ascertained by a test circuit outside of the circuit observing an output of the phase detector, wherein the test circuit manipulates the observed output and generates a performance metric for the DCO based, at least in part, on the

manipulation;

a variable phase accumulator coupled to the DCO and the phase detector, the variable phase accumulator containing circuitry to compute the variable phase; and

a loop filter coupled to the phase detector and the DCO, the loop filter to provide a desired amount of attenuation to the computed difference between the reference phase_and the variable phase, wherein the loop filter is of a type selected from a group consisting of a finite impulse response filter, an infinite impulse response filter or combination thereof.

48. A method for operating a cellular phone, comprising:

performing built-in self-test (BIST) on a parameter associated with the cellular phone; and

reporting to a cellular service provider through a wireless medium when the BIST reports the parameter to be degraded beyond a limit.

49. The method of claim 48, wherein the performing step is done on power-up of the cellular phone.

50. The method of claim 48, wherein the parameter is an RF system parameter.

51. The method of claim 50, wherein the RF system parameter is a distortion in a phase error trajectory.

52. The method of claim 48, further comprising a step of notifying a user of the cellular phone that the parameter is degraded beyond a limit.

53. The method of claim 52, wherein the notifying step is done wirelessly.

54. The method of claim 52, wherein the notifying step is done through a service bill.

EVIDENCE APPENDIX

Two documents are being submitted with this Appeal Brief as evidence:

1) A definition of the term "radio frequency (RF)" - (Communications Standard Dictionary, Second Edition, 1989)(Attachment-1).

2) A definition of the term "radio frequency" -(The IEEE Standard Dictionary of Electrical and Electronics Terms, Sixth Edition (1996)(Attachment-2).

Communications Standard Dictionary

Second Edition

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Reston, Virginia

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New York

ATTACHMENT I – 1

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iakes use of *radio determination.*

radio-determination service

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: of radio to assist in the determina-
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radio frequency (RF). Those *frequencies* of the *electromagnetic spectrum* that are normally associated with *radio-wave propagation.* The nomenclature of radio frequencies is as follows:

Frequency Subdivision	Frequency Range	Metric Subdivision
VLF	3–30 KHz	myriametric waves
LF	30–300 KHz	kilometric waves
MF	300–3000 KHz	hectometric waves
HF	3–30 MHz	decametric waves
VHF	30–300 MHz	metric waves
UHF	300–3000 MHz	decimetric waves
SHF	3–30 GHz	centimetric waves
EHF	30–300 GHz	millimetric waves
THF	300–3000 GHz	decimillimetric waves

Also see *frequency spectrum designation.*

radio frequency bandwidth. The difference between the highest and lowest *values* of the *emission frequencies* in the region of the *carrier frequency.* In single-*channel* emission, it is the region of the carrier frequency beyond which the *amplitude* of any frequency, such as those that result from *modulation,* those that are *subcarrier frequencies,* or those that result from *distortion* products, is less than 5% (–26 *dB*) of the rated *peak output amplitude* of the carrier of a *single-tone sideband,* whichever is greater. For *multiplex* emission, the radio frequency *bandwidth* is the same, except that the 5% applies to the subcarrier or a single-tone sideband of the carrier, whichever is the greater. Synonymous with *RF bandwidth.* Also see *necessary bandwidth; nominal bandwidth; occupied bandwidth.*

radio frequency channel increment. The *frequency* separation between adjacent *channels* in a multichannel *transmission system.*

radio frequency combining. The *combining* of a number of multi*channel trunks* for *voice, digital data,* or other *transmissions* over a single *wideband facility* where the combining action occurs at *radio frequencies* as opposed to *video* or *audio frequencies.* Synonymous with *frequency-division multiplex combining.*

radio frequency interference (RFI). 1. *Interference* that is generated or induced in electronic *circuits* and is in the *radio frequency range* of the *electromagnetic spectrum.* 2. *Electromagnetic* phenomena that either directly or indirectly can contribute to a degradation in performance of a *receiver* or other *system.*

radio frequency intermodulation. A constituent of *nonlinear distortion* that consists of the occurrence of *harmonics* in the *response of electrical components.* The harmonics are caused by *intermodulation distortion* in the *radio frequency stages* of a *receiver.*

The IEEE Standard Dictionary of Electrical and Electronics Terms

Sixth Edition

Standards Coordinating Committee 10, Terms and Definitions
Jane Radatz, Chair

This standard is one of a number of information technology dictionaries being developed by standards organizations accredited by the American National Standards Institute. This dictionary was developed under the sponsorship of voluntary standards organizations, using a consensus-based process.

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ATTACHMENT II -1

radio frequency (1) (A) (data transmission) (Loosely) The frequency in the portion of the electromagnetic spectrum that is between the audio-frequency portion and the infrared portion. **(B) (data transmission)** A frequency useful for radio transmission. *Note:* The present practicable limits of radio frequency are roughly 10 kHz (kilohertz) to 100 000 MHz (megahertz). Within this frequency range electromagnetic radiation may be detected and amplified as an electric current at the wave frequency. (PE) 599-1985w

(2) (radio-wave propagation) A frequency in the radio spectrum. (AP) 211-1990

(3) (power line filters) A frequency in the portion of the electromagnetic spectrum that is between the audio frequency portion and the infrared portion. (EMC) C63.13-1991

radio-frequency alternator A rotating-type generator for producing radio-frequency power. (AP) 145-1983s

radio-frequency attenuator (signal-transmission system) A low-pass filter that substantially reduces the radio-frequency power at its output relative to that at its input, but transmits lower-frequency signals with little or no power loss. *See also:* signal. (IE) [43]

radio-frequency converter A power source for producing electric power at a frequency of 10 kHz and above. (IE/IA) 169-1955w

radio-frequency generator (1) (signal-transmission system) A source of radio-frequency energy. (IE) [43]

(2) (induction heating) A power source for producing electric power at a frequency of 10 kHz and above. (IA) 54-1955w

radio-frequency generator, electron tube type (induction and dielectric usage) A power source comprising an electron-tube oscillator, an amplifier if used, a power supply and associated control equipment. *See also:* Colpitts oscillator; Hartley oscillator; magnetron; tuned grid-tuned plate oscillator. (IA) 54-1955w

radio frequency interference *See:* radio interference.

radio frequency link (test, measurement, and diagnostic equipment) A radio frequency channel or channels used to connect the unit under test with the testing device. *Synonym:* RF link. (MIL) [2]

radio frequency protection guides (radio frequency electromagnetic fields) The radio frequency field strengths or equivalent plane wave power densities which should not be exceeded without:

a) careful consideration of the reasons for doing so,
b) careful estimation of the increased energy deposition in the human body, and
c) careful consideration of the increased risk of unwanted biological effects.

(NIR) C95.1-1982s

radio-frequency pulse A radio-frequency carrier amplitude modulated by a pulse. The amplitude of the modulated carrier is zero before and after the pulse. *Note:* Coherence of the carrier (with itself) is not implied. (IM) 194-1977w

radio-frequency switching relay A relay designed to switch frequencies that are higher than commercial power frequencies with low loss. (PE) 43-1974r

radio-frequency system loss (mobile communication) The ratio expressed in decibels of the power delivered by the transmitter to its transmission line to the power required at the receiver-input terminals that is just sufficient to provide a specified signal-to-noise ratio at the audio output of the receiver. *See also:* mobile communication system. (VT) [37]

radio-frequency transformer A transformer for use with radio-frequency currents. *Note:* Radio-frequency transformers used in broadcast receivers are generally shunt-tuned devices that are tunable over a relatively broad range of frequencies. *See also:* radio transmission. (CHM) [51]

radio gain (radio-wave propagation) Of a radio system, the reciprocal of the system loss. (AP) 211-1977s

radio horizon (1) (data transmission) (of an antenna) The locus of the farthest points at which direct rays from the antenna become tangential to the planetary surface. *Note:* On a spherical surface the horizon is a circle. The distance to the horizon is affected by atmospheric reflection. (AP) 145-1983s

(2) (radio-wave propagation) The locus of points at which the direct rays from a point source of radio waves are tangent to the surface of the Earth. *Note:* In general, the radio and geometric horizons differ because of atmospheric refraction. (AP) 211-1990

radio-influence field (RIF) Radio-influence field is the radio noise field emanating from an equipment or circuit, as measured using a radio noise meter in accordance with specified methods. *See also:* electromagnetic compatibility. (CHM/EMC) [51]

radio-influence tests Tests that consist of the application of voltage and the measurement of the corresponding radio-influence voltage produced by the device being tested. (PE/SWG) C37.100-1992, C37.40-1981s

radio-influence voltage (RIV) (1) (metal-oxide surge arresters for ac power circuits) (surge arresters) A high-frequency voltage, generated by all sources of ionization current, that appears at the terminals of electric-power apparatus or on power circuits. (PE/PSPD) C62.1-1981s, C62.11-1993

(2) (outdoor apparatus bushings) A high-frequency voltage generated as a result of ionization, which may be a propagated by conduction, induction, radiation or a combined effect of all three. (PE) 21-1976

(3) (high-voltage ac cable terminations) The radio noise appearing on conductors of electric equipment or circuits, as measured using a radio-noise meter as a two-terminal voltmeter in accordance with specified methods. (PE) 48-1996

(4) (overhead-power-line corona and radio noise) The radio frequency voltage appearing on conductors of electrical equipment or circuits, as measured using a radio noise meter as a two-terminal voltmeter in accordance with specified methods (generally termed conducted measurements). *Note:* The term *influence* was coined to avoid the general admission that power systems would generate and conduct interference. The term *influence* is used only in North America; the term *interference* is preferred elsewhere. (PE/T&D) 539-1990

(5) (power and distribution transformers) A radio frequency voltage generally produced by partial discharge and measured at the equipment terminals for the purpose of determining the electromagnetic interference effect of the discharges. *Notes:* 1. "RIV" can be measured with a coupled radio interference measuring instrument and is commonly measured at approximately 1 MHz, although a wide frequency range is involved. 2. "RIV" values are often used as an "index" of "partial discharge" intensity. 3. The RIV of equipment was historically measured to determined the influence of energized equipment on radio broadcasting, hence—RIV. (PE) C57.12.80-1978r

radio interference (overhead-power-line corona and radio noise) Degradation of the reception of a wanted signal caused by RF disturbance. *Notes:* 1. RF disturbance is an electromagnetic disturbance having components in the RF range. 2. The English words "interference" and "disturbance" are often used indiscriminately. The expression "radio frequency interference" is also commonly applied to an RF disturbance or an unwanted signal. *Synonym:* radio frequency interference. (PE/T&D) 539-1990

radio interferometer (radio-wave propagation) A type of radio telescope that uses two or more physically separated collecting elements in order to achieve high angular resolution of the brightness temperature distribution of a radio source. (AP) 211-1990

radiolocation (navigation aid terms) Position determination by means of radio aids for purposes other than those of navigation. (AE) 172-1983w

radio magnetic indicator
combined indicating ins
indications to a display re
tion finder) display, one
the omnirange station;
heading, and relative bea
radiometric sextant (nav
which measures the dire
and tracking the nonvisib
radiation includes radio,

radiometry (1) (fiber opti
surement. The basic quan

(2) The measurement of
energy and power.
radio navigation (navigati
reception of radio signals.
radio noise (1) (radio nois
substations) Any unwan
quency band, such as unde
transmission channel or d
(2) (radio noise from o
tions) An electromagnet
upon a wanted signal and

(3) (overhead-power-lin
magnetic noise having c
range.
radio noise field strength
radio noise) A measure
radio noise at a given loca
tity measured is not the
interfering waves but som
bears a known relation to
2. The radio noise field st
quasi-peak, or peak val
function of the radio nois
field strength is expresse
1 μV/m, per unit bandw

radiophare (navigation aid
national terminology, me

radio propagation path (m
wave propagating from o
distance between the tran
See also: mobile commun
radio proximity fuse A rad
detonate it within prede
target by means of electr
get. *See also:* radio transn

RELATED PROCEEDINGS APPENDIX

Appellants are not aware of any pending appeal or interferences in related applications.